IN THE CLAIMS:

Rewrite the pending claims as follows:

1. (Original) A method for obtaining an ambiguity-resolved, refraction-corrected GPS carrier-phase measurement, comprising:

obtaining carrier-phase measurements on three carrier frequencies;

forming at least two wide-lane carrier phase measurements based on the carrier-phase measurements on the three carrier frequencies;

resolving whole-cycle ambiguities in the wide-lane carrier-phase measurements; and

using the ambiguity-resolved wide-lane measurements to form the ambiguity-resolved, refraction-corrected GPS carrier-phase measurement.

2. (Original) The method of claim 1 wherein the three GPS frequencies include a first frequency, a second frequency frequency, and a third frequency, the wide-lane carrier phase measurements include a first wide-lane carrier-phase measurement formed using carrier-phase measurements on the first and the second frequencies and a second wide-lane carrier-phase measurement formed using carrier-phase measurements on the second and the third frequencies, and the ambiguity-resolved, refraction-corrected GPS carrier-phase measurement comprises a difference between the first wide-lane measurement and a multiple of the second wide-lane measurement.

3. (Original) The method of claim 1 wherein a ionospheric refraction error in the first wide-lane measurement is approximately equal to the ionospheric refraction error in the multiple of the second wide-lane measurement.

4. (Original) The method of claim 1 wherein the whole-cycle ambiguity in each wide-lane carrier-phase measurement is resolved based on a frequency-weighted average of corresponding GPS code measurements, an error caused by ionospheric refraction in the frequency-weighted average matching an error caused by ionospheric refraction in the wide-lane carrier-phase measurement.

5. (Currently amended) A method for generating a~~n ambiguity-resolved, refraction-corrected, and noise-minimized~~ carrier-phase measurement, comprising:

forming a first composite measurement using GPS carrier-phase measurements on three GPS frequencies;

forming a second composite measurement using GPS carrier-phase measurements on at least two GPS carrier frequencies; and

smoothing the first composite measurement with the second composite measurement.

6. (Original) The method of claim 5 wherein the first composite measurement is a linear combination of the GPS carrier-phase measurements on the three GPS carrier frequencies.

7. (Original) The method of claim 5 wherein the first composite measurement is ambiguity-resolved and forming the first composite measurement comprises:

obtaining carrier-phase measurements on the three frequencies;

forming at least two wide-lane carrier phase measurements based on the carrier-phase measurements on the three frequencies; and

resolving whole-cycle ambiguities in the wide-lane carrier-phase measurements;

using the ambiguity-resolved wide-lane measurements to form the first composite measurement.

8. (Original) The method of claim 7 wherein the whole-cycle ambiguity in each wide-lane carrier-phase measurement is resolved based on a frequency-weighted average of corresponding GPS code measurements, an error caused by ionospheric refraction in the frequency-weighted average matching an error caused by ionospheric refraction in the wide-lane carrier-phase measurement.

9. (Original) The method of claim 5 wherein the second composite measurement is formed to have a small multi-path noise therein.

10. (Original) The method of claim 5 wherein the second composite measurement is formed using carrier-phase measurements on all of the three frequencies.

11. (Original) The method of claim 5 wherein the second composite measurement includes unresolved whole-cycle ambiguities.

12. (Original) The method of claim 5 wherein the second composite measurement has a wavelength of about 10.8 centimeters.

13. (Original) The method of claim 12 wherein the second composite measurement has a noise level of about 2.7 centimeters assuming equal phase-noise in each of the carrier-phase measurements on the three frequencies.

14. (Currently amended) The method of claim 5 wherein the first and the second composite measurements are scaled by there respective wavelengths and wherein smoothing the first composite measurement with the second composite measurement comprises:

computing an offset between the first composite measurement and the second composite measurement at each of a plurality of measurement epochs;

smoothing the offset in an expanding average over the plurality of measurement epochs; and

adding the smoothed offset to the second composite measurement to obtain ~~the~~ an ambiguity-resolved, refraction-corrected, and noise reduced ~~minimized~~ GPS carrier-phase measurement.

15. (Currently amended) A positioning or navigation system, comprising:

a GPS receiver configured to obtain GPS code and carrier-phase measurements based on signals from a plurality of satellites in view of the GPS receiver, the signals being transmitted in three different carrier frequencies;

a computer system coupled to the GPS receiver, the computer system includes a processor and a memory coupled to the process, the memory storing therein program instructions~~ which, when executed by the processor, performs a method for generating an ambiguity-resolved, refraction-corrected, and noise-minimized composite carrier-phase measurement~~, the program instructions comprising:

instructions for forming a first composite measurement using GPS carrier-phase measurements on the three carrier GPS frequencies;

instructions for forming a second composite measurement using GPS carrier-phase measurements on at least two GPS carrier frequencies; and

instructions for smoothing the first composite measurement with the second composite measurement.

16. (Original) The positioning system of claim 15, wherein the instructions for forming the first composite measurement comprise:

instructions for forming at least two wide-lane carrier phase measurements based on the carrier-phase measurements on the three carrier frequencies;

instructions for resolving whole-cycle ambiguities in the wide-lane carrier-phase measurements; and

instructions for using the ambiguity-resolved wide-lane measurements to form the first composite measurement.

17. (Original) The positioning system of claim 15 wherein the second composite measurement is formed to have a small multi-path noise therein.

18. (Original) The positioning system of claim 15 wherein the second composite measurement is formed using carrier-phase measurements on all of the three frequencies.

19. (Original) The positioning system of claim 15 wherein the second composite measurement includes unresolved whole-cycle ambiguities.

20. (Currently amended) The positioning system of claim 15 wherein the instructions for smoothing the first composite measurement with the second composite measurement comprise:

instructions for computing an offset between the first composite measurement and the second composite measurement at each of a plurality of measurement epochs;

instructions for smoothing the offset in an expanding average over the plurality of measurement epochs; and

instructions for adding the smoothed offset to the second composite measurement to obtain ~~the~~ an ambiguity-resolved, refraction-corrected, and noise reduced ~~minimized~~ GPS carrier-phase measurement.